

6.0 SUMMARY OF FINDINGS

6.1 INTRODUCTION

1. This GWRFI Report presents the technical data and results of ground water investigations performed at the LMC former ILM facility in Torrance, California. The GWRFI covers the time period from August 1994 through November 1999.
2. The purpose and objectives of the GWRFI were to determine the nature and extent of releases to the ground water of hazardous wastes or constituents from regulated units, SWMUs and other AOCs at the former facility. Additionally, data was gathered on the environmental setting, hydrogeology and potential impacts on receptors to support a Corrective Measure Study, if required.
3. The GWRFI was performed pursuant to the Scope of Work for a RCRA Facility Investigation as described in Attachment D of the Corrective Action Consent Agreement between the DTSC and LMC, dated December 1998, and the approved workplans.
4. Findings of the GWRFI are summarized in the following sections and provide a description and understanding of the site and ground water conditions.

6.2 FACILITY DESCRIPTION AND HISTORY

1. The former ILM facility site comprises approximately 67.4 acres. Operations at the former ILM facility began around the beginning of World War II and continued under various ownerships until 1992. Primary operations consisted of the manufacturing of extruded and forged aluminum and titanium products, which included a foundry for melting and alloying aluminum for the extrusion and forge presses. It was during this period of time that associated facility operations resulted in releases of contaminants (primarily VOCs, TPHs and metals) to the soils and underlying shallow ground water.

6.3 ENVIRONMENTAL SETTING

1. The site is currently zoned M2, for light industrial uses. This zoning excludes residential dwellings, schools, hospitals, and other such uses. The site and surrounding sites have historically been zoned industrial and they are unlikely to change in the foreseeable future.

2. The ecological assessment indicates the potential for impacts is low since the relatively barren habitat at the site does not present a significant utilization area for wildlife.
3. The site is at an elevation of approximately 55 feet above msl and has a relatively flat topography. Current and future development provides for a covered surface with stormwater run-off collection and discharge to a stormwater system. The average yearly rainfall is approximately 14 inches. These conditions result in minimal infiltration of rainwater at the site and surrounding areas.
4. The site is located within the West Coast Basin in which ground water occurs in a series of Quaternary age hydrologic units of varying water quality and usage. These units are, from the surface downward, the Semiperched aquifer, Bellflower aquiclude, Gage aquifer, Lynwood aquifer and Silverado aquifer. The Semiperched aquifer is relatively thin unit at the site (from the surface to a depth of approximately 25 feet). It does not contain water, and in areas within the West Coast Basin where it has contained water, it is reportedly of little beneficial use due to its poor quality and low yield.
5. Ground water is first encountered at the site at a depth of approximately 65 to 70 feet below the surface, in the more permeable units of the upper portion of the Bellflower aquiclude. This water is believed to have similar characteristics to waters of the Semiperched aquifer; i.e., regionally poor quality and low yield. This water is separated from the deeper water of the Gage aquifer by the lower portion of the Bellflower aquifer which is approximately 15 to 20 feet thick and consists of less permeable silts and clays.
6. The potential recharge to this shallow water bearing zone in the Bellflower aquiclude from the current unpaved areas of the former ILM facility is minimal and will be reduced further upon completion of the site development in early 2000. The surrounding industrial areas are also heavily paved and offer little recharge potential. Currently, a majority of the shallow ground water recharge and discharge is likely from subsurface inflow and outflow across the projected property lines. Since 1994, the water levels in the wells onsite have risen an average of approximately 3 feet; likely the result of the addition of freshwater along injection barriers in the West Coast Basin.
7. Based on aquifer tests in this shallow ground water at the adjacent BRC property, the horizontal hydraulic conductivity ranges from approximately 1.0×10^{-3} to 2.0×10^{-2} cm/sec. However, due to a very flat horizontal gradient (average of 0.003 ft/ft to the east/southeast),

the rate of ground water movement is estimated to be approximately 9 to 170 feet per year. The vertical gradient was also estimated onsite at approximately 0.003 to 0.004 ft/ft. Considering the lower permeability silt and clay materials in the lower Bellflower aquiclude below this shallow water, the vertical movement is estimated to be one to two orders of magnitude lower (e.g., 0.09 to 17 feet per year).

8. The shallow water bearing zone has also been impacted by other current or former industrial sites upgradient and downgradient from the former ILM facility. The closest downgradient site which has also impacted the shallow ground water is the adjacent BRC property to the east, beyond the edge of the plumes identified in this GWRFI. Ground water contaminants from these surrounding sources include VOCs, SVOCs, pesticides, cyanide, TPHs and metals.

6.4 LIMITS OF GROUND WATER IMPACTS

1. The limits of ground water impacts at the former ILM facility have been determined as a result of the investigations performed in this GWRFI. The investigations have included the installation of 26 onsite and eight offsite ground water monitoring wells and the performance of nine rounds of ground water sampling along with numerous gauging events over a time period of 4.5 years.
2. Ground water impacts in the shallow water at the site are characterized by localized plumes of chlorinated VOCs, primarily TCE and PCE, and hexavalent chromium. Other chlorinated VOCs and metals are present, but at significantly lower and/or non-impacting levels. TPHs have also been detected in some wells, but are at low and non-impacting levels.
3. The current results (July 1999) indicate seven isolated and/or merged TCE plumes greater than 1,000 µg/L. The highest concentration detected was 10,000 µg/L in a plume on the central eastern boundary of the site and which extends approximately 500 feet offsite to the east (see Figure 5.3). Only one isolated PCE plume greater than 100 µg/L was indicated (see Figure 5.6). The highest PCE concentration detected was 230 µg/L in this centrally located plume. The PCE plume also correlates with one of the centrally located TCE plumes. One isolated hexavalent chromium plume greater than 1,000 µg/L is also indicated in the shallow ground water (see Figure 5.9). The highest concentration detected was 1,070 µg/L in a plume on the central eastern boundary of the site which correlates with the TCE plume at that location.

4. Evaluation of these plumes over the time frame from 1995 to the present indicates the plumes are becoming smaller and the elevated concentrations are decreasing. In most wells, elevated TCE concentrations have decreased from 33 to 96 percent; PCE concentrations have decreased from 67 to 74 percent, and hexavalent chromium concentrations have decreased from 79 to 97 percent. Most of the decreases in TCE, PCE, and hexavalent chromium concentrations have occurred since 1996, after soil remediation activities at the former ILM facility were completed. In addition, due to the relatively flat gradient and low ground water velocity at the site, the plumes do not appear to be migrating downgradient from the former release areas. Also, analytical results from adjacent wells screened at different depths in the shallow ground water onsite indicate little to no downward vertical migration. Overall, the predominant contaminant, TCE, does not appear to extend offsite more than approximately 500 feet at a concentration greater than 100 µg/L. This condition appears to be in decline based on data trends collected over 4.5 years.

6.5 POTENTIAL FOR NATURAL ATTENUATION

1. Natural attenuation parameter data based on DTSC and EPA checklists was collected in the most recent sampling event to assess whether degradation of the chlorinated VOCs present in the shallow ground water at the site and adjacent site was occurring. Specifically, data related to biological and, to a lesser extent, chemical degradation were obtained from analysis of field and laboratory samples.
2. A screening analysis for natural attenuation by biological and chemical degradation was performed on the ground water data collected using the EPA protocol for evaluating natural attenuation. The analysis involved a comparison of the parameter results for wells impacted with the highest concentrations of chlorinated hydrocarbons versus background wells. The results of the comparison identified only small differences between impacted and non-impacted wells, indicating only minimal natural degradation of chlorinated hydrocarbons in the impacted shallow water bearing zone below the site. A screening analysis scoring for potential anaerobic biodegradation, primarily by reductive dechlorination, also resulted in an "inadequate evidence" score.
3. However, since the source areas of contamination in the soils have been remediated at the site, the analytical data trends for contaminants in the ground water suggest other natural

attenuation processes such as chemical and, more likely, physical processes (e.g., dispersion/diffusion and advective flow, etc.) have been effective in reducing the chlorinated hydrocarbons and hexavalent chromium concentrations and plumes.

6.6 POTENTIAL IMPACTS ON HUMAN AND ENVIRONMENTAL RECEPTORS

1. Human and environmental receptors are unlikely to be exposed to constituents of concern (e.g., VOCs and metals) in the ground water under either current or potential future conditions. Based on the current and anticipated future land use considerations (e.g., light industrial), the potential onsite receptors include adult workers. The potential offsite receptor populations include offsite adult and child residents and offsite adult workers. Ground water is not considered a significant medium of exposure for ecological receptors at the site or surrounding area due to the relatively barren habitat.
2. Because there are no current ground water extraction wells onsite, or likely to be in the future, exposure pathways are limited to volatilization and inhalation (low potential) for onsite and offsite receptors, and hypothetical ground water use exposures (e.g., hypothetical offsite extraction well) by offsite receptors. A water well survey did not identify extraction wells within 0.5 miles of the site. Extraction wells within 2 miles downgradient of the site are screened in the deeper aquifers, below the Bellflower aquiclude.
3. The quantification of exposure will be conducted as a component of the ground water risk assessment that will be submitted as a separate document to the DTSC. The results of the risk assessment in conjunction with the findings of the GWRFI herein, will be utilized to assess the need for a ground water corrective measures study.
4. At this time, there are no known historical or current impacts on human or environmental receptors from releases into the ground water identified at the former ILM facility.